

1 Interview Summaries

1.1 Maine Department of Transportation (DOT)

Interview Type	Personal, State Agency
Interview Location	DOT Offices, Augusta
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Staff Size (approx)	2400
Budget (approx)	\$420,000,000
URL:	http://www.state.me.us/mdot/

1.1.1 Agency Overview

The Maine Department of Transportation plans and develops transportation facilities and services that contribute to the economic growth of the State of Maine and the wellbeing of its people. The department plans for future transportation needs, and assists in the development, operation, and maintenance of services and facilities while promoting transportation safety. The DOT administers or assists in

- An internal highway system incorporating safety, environmental conservation, economic considerations and scenic values
- Freight and passenger rail transportation
- Port and water transportation facilities
- Monitoring and facilitating multimodal transportation, including rail, aviation, ferry and bicycle, and improving the State's role in providing access to these infrastructure services.

1.1.2 GIS Initiatives

1.1.2.1 Overview of GIS Utilization

DOT has moved strongly toward GIS for managing complexities of statewide transportation infrastructure. Predictably, the primary modeled feature set is the Maine state roads network. Two primary databases are used to maintain this model:

TIDE (Transportation Information for Decision Enhancement) integrates an Oracle relational database management system with GIS query and display tools provided via ESRI ArcView 3.2. The TIDE database is refreshed weekly from the TINIS database.

TINIS (Transportation Integrated Network Information System) is a 20-year old linear referencing system that maintains information describing physical and operational characteristics of the Maine public roads system, including railroad grade crossings.

1.1.2.2 GIS Operating Environment and Infrastructure

The Maine DOT currently maintains considerable GIS analytical and engineering capacity. This includes

- 100+ Bentley Microstation seats (engineering)
- 30+ ArcView seats
- 12 ArcInfo seats (Arc 7.x, NT, all operated locally)
- Citrix is running and will be utilized shortly to serve ArcView licenses
- In the process of implementing Oracle Spatial for TIDE

DOT has standardized on ESRI products for core GIS activities, using ArcInfo for feature manipulation and ArcView for desktop viewing. Their client-server architecture accesses GIS data through high-end PCs over the the department's Local Area Network. DOT maintains numerous small and large format plotting devices.

1.1.2.3 GIS Data Resources and Requirements

1.1.2.3.1 Spatial Data

The Maine DOT maintains numerous GIS layers for basemapping and analysis purposes. Estimated number of layers maintained exceeds 25.

Existing data sets include:

- Highways are modeled (in the TINIS system) on a node-link network. Lines are broken at intersections and other pertinent features (including municipal civil division boundaries). There are approximately 56,000 nodes and 76,000 links in the network. Each link knows what route or routes it belongs to. This network is exported to individual county coverages for use and manipulation in Arc7.x, but this will change shortly following the migration to the Oracle geodatabase in which all counties will be fused.
- The TIDE databases consist of TINIS and the agency's Pavement Management System. TIDE provides access to Maine DOT's legacy databases, maintains historical data for trend analysis, provides highway needs and adequacy reporting, vehicle occupancy queries, bicycle level of services queries, safety analysis, bridge analysis, local road assistance queries, and numerous others.
- Railroad crossings
- Crashpoints
- Project histories (since 1989 and regularly updated)
- Townlines (enhanced municipal civil boundaries)
- Tribal lands (polygons generated and maintained by DOT of all tribal lands in Maine)
- Urban areas
- Multimodal datalayers including ferry, rail, bicycle and transit routes and resources; ferry ridership, rail freight information

Basemap features:

MeGIS basemap layers

Canadian 100,000 scale data from Geogratis (Canadian Land Inventory spatial data distribution system)

Currently unavailable but desired data sets include:

- Enhanced municipal civil boundaries (development underway)
- More complete orthophoto coverage
- Better integrated New England and Northeast transportation network maps
- Right of Way project tracking system: Parcels/registry data to provide right of way information for takings.

1.1.2.3.2 Attribute and Related Data

- TINIS and TIDE are attribute databases that are spatially enabled through their node-line network and integration with ArcView and ArcInfo products.
- DOT maintains a video log of 8300 road miles of highway system in Maine. This is captured on a 2-year cycle; Interstates are collected every year. No sign inventory has been collected from this to date.

1.1.2.3.3 Data Issues

- Engineering GIS data is currently in stateplane and requires a coordinate projection to overlay with OGIS UTM Zone 19 NAD83 Meters data.
- DOT has been working to develop more accurate municipal civil division boundaries. This effort is being undertaken in concert with MeGIS and LURC. In many cases these need clarification, and they suffer from having no custodian at MeGIS or elsewhere.

1.1.2.4 GIS Applications and Application Requirements

Maine DOT uses GIS extensively for analysis, modeling and map production.

- The DOT travel modeling initiative uses the TRIPS software from MVA Systematica. <http://tmip.fhwa.dot.gov/clearinghouse/docs/gis/maine/> . The travel demand model provides a standard forecast of statewide traffic growth that can be used to evaluate capital improvement projects and as inputs for air quality analysis. GIS has been beneficial in providing key tools to manage complexity of this network, display volume to capacity ratios and other quantitative outputs, and for error identification and calibration of the model.
- TIDE provides access to TINIS and the agency's Pavement Management System, connects to DOT's legacy databases through multiple linear referencing methods, maintains historical data for trend analysis, provides both a standard and an ad hoc query environment, and has spatial query capabilities. Examples of TIDE applications include highway needs and adequacy reporting, vehicle occupancy queries, bicycle level of services queries, safety analysis, bridge analysis and local road assistance queries.
- Droads for pavement management
- Exor Highways
- Maine Department of Public Safety is utilizing the TIDE system through Citrix.

- I-395 Alternative ArcIMS Webmap application and associated alternative maps <http://www.i395-rt9-study.com/> is a simple yet innovative approach to project specific data sharing.
- East-West Highway planning at DOT and with environmental groups
- Wetlands data capture: DOT is archiving detailed wetlands information, but only for areas specifically impacted by transportation corridors and mitigation.
- DOT sells individual map sheets on demand and produces such map series as:
 - County highway series
 - Urban street maps series (125 maps in series)

Planned future GIS activity and applications:

- State police crash reporting: Police keep laptops in their cruisers and fill in crash data information directly at point of capture. This information is transmitted to the Department of Public Safety. Police identify location from picklist of cross streets and landmarks, recording distance from nodes. This system will be operational in first quarter 2002.
- DOT is looking at options for more frequent and exhaustive orthophoto collection and rectification in areas of highway improvement work, and is working with other agencies to index and share photographic holdings. These include the Department of Marine Resources and Forest Service. DOT is investigating building a library of these images. There is no intention of making this a revenue producing initiative.

1.1.3 Other Relevant Issues

- DOT reviews all towns on a four year cycle to certify mileage for road maintenance reimbursement under the urban-rural initiative program. 125 towns/year are reimbursed for lane miles maintained. All new or re-aligned public roads are GPS ground truthed.
- DOT has been working with Maine OGIS to establish parameters for conflating roads data with E-911 roads to produce a master roads centerline database. Both data sets use single centerline geometry and have comparable spatial integrity.
- DOT processes significant data requests from public and private entities. The estimated number of these requests exceeds 200/year. Prominent private companies consistently requesting data include Delorme, GDT, AAA, Rand McNally and Michelin Guides.
- DOT produces maps for other state agencies, including the Department of Economic and Community Development, the State Planning Office and the Governor. When legislature is in session demand for maps spikes significantly.
- DOT feels that in order to streamline integration of its datasets with MeGIS, that office needs a dedicated metadata expert to facilitate data validation and check-in for hosting.
- CoGs are interested in gaining access to the TIDE road network query and display system. This is an application environment and would be delivered via Citrix. AVCOG has been the most persistent requester of this service to date.

- Personnel/technical capability is a tough impediment. Twice as much money spent never yields twice the benefit. Turnover of information systems developers is uncomfortably high at DOT as well as other state agencies.
- DOT has been working hard to make GIS application development just another part of departmental application development. There is an acceptance that it has to find its way “into the DNA of established business functions” for it to achieve its full utility.

1.1.4 Major Benefits and Cost Justification

- DOT/MeGIS E911 centerline conflation:
The two databases should be combined to create a master road centerline database. A viable methodology has been developed, and estimated time of completion is late 2002. Benefits of this effort will be :
 - Cooperative update and maintenance; centralized and less expensive
 - A single master database that facilitates sharing of information and reduces redundancy
 - Universal user access to the most up-to-date attributes and consistent roads geometry
 - A common centerline strategy will make it more attractive for numerous agencies to potentially tie into the TIDE system, accessing its rich Oracle-based attribute set for analysis of such values as traffic counts and using it to anticipate impacts of seasonal and overall traffic growth.